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The impact of commercial aviation on naval aviation

Imhoff, Patrick J.

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THE IMPACT OF COMMERCIAL AVIATION ON NAVAL AVIATION

by

Patrick J. Imhoff

June 2016

Thesis Advisor: Amilcar Menichini
Second Reader: Robert Eger

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For the first time in over 15 years, commercial airlines are hiring large numbers of pilots and threatening retention rates for naval aviation. One major concern for Navy leadership is if there is a major difference in compensation for aviators who transition to the airlines after 10 years when compared to aviators who make that transition after retirement. The other concern is how the new blended retirement plan will impact compensation and ultimately retention.

Using net present value, this research discounted career earnings back to the point at which a naval aviator chooses to stay in the service or seek commercial employment. It was revealed that aviators who decide to leave the service after 10 years stand to earn significantly more money than those who remain until retirement.

Aviation Career Continuation Pay was analyzed and alternate payment plans were studied to provide options for the Navy to shrink the gap in compensation. Ultimately, if the Navy is willing to spend more money on compensation, they can close the compensation gap and hopefully prevent future retention problems.

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THE IMPACT OF COMMERCIAL AVIATION ON NAVAL AVIATION

Patrick J. Imhoff
Lieutenant Commander, United States Navy
B.S., United States Naval Academy, 2004

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June 2016

Approved by: Amilcar Menichini, Ph.D.
Thesis Advisor

Robert Eger, Ph.D.
Second Reader

Donald Summers, Ph.D.
Academic Associate,
Graduate School of Business and Public Policy

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LIST OF ACRONYMS AND ABBREVIATIONS

ACCP	Aviation Career Continuation Pay
ACIP	Aviation Career Incentive Pay
ADSO	Active Duty Service Obligation
ASED	Aviation Service Entry Date
BAH	Basic Allowance for Housing
BAS	Basic Allowance for Subsistence
CCR	cumulative continuation rates
COLA	cost of living adjustments
CP	continuation pay
DB	defined benefits
DC	defined contributions
DH	department head
DOD	Department of Defense
ECI	Employment Cost Index
FAA	Federal Aviation Administration
FO	first officer
FV	future value
FWP	fixed-wing pilots
GAO	Government Accountability Office
MCRMC	Military Compensation and Retirement Modernization Commission
NAVADMIN	naval administrative message
NFO	naval flight officer
NPC	Navy Personnel Command
NPV	net present value
PV	present value
RWP	rotary-wing pilots
TMC	total military compensation
TSP	thrift savings plan

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I. INTRODUCTION

A. BACKGROUND

As the economy continues to improve following 2008's recession, unemployment rates continue to fall and that concerns some senior members of the Navy. Vice Admiral Bill Moran, the Navy's Deputy Chief of Naval Operations for Manpower, Personnel, Training and Education (N1) is concerned there may be a pending sailor exodus. He recently said "we've had historic retention levels for the last several years and with historic highs comes, at some point, a turn in the other direction. There are signs that we could be heading in that other direction" (LaGrone, 2014). Vice Admiral Moran verified that one group he is particularly worried about are naval aviators. As LaGrone pointed out, he is worried that recent patterns of airline hiring along with airline growth and expansion will negatively affect retention among aviators.

The commercial airline industry appears to have confirmed VADM Moran's worries. A recent study by Kent Lovelace, the chairman of the aviation department at the University of North Dakota revealed a projected shortfall of 35,000 pilots in the next 20 years (Jansen, 2013). Some of the reasons listed by Jansen for the projected shortfall are increases in the required training of pilots, extended rest periods, and a mandatory retirement age of 65.[1]

According to Jansen, the Federal Aviation Administration (FAA) mandated increased training in 2013; co-pilots were now required to complete a minimum of 1,500 flight hours, rather than the previous 250-hour requirement. This new requirement, Jansen indicated, discouraged civilian students hoping to pursue airline careers, whose potential flight school loans were already upwards of $100,000, with first-year officer salaries ranging only between $20,000 and $50,000. While the FAA increased the minimum hours to 1,500, however, they did not require that all applicants meet that standard. Military pilots are only required to have 750 hours, an accomplishment that

[1] The retirement age was extended from 60 to 65 in 2007, which delayed this potential problem for five years.

almost every military pilot will reach well before they have the opportunity to separate from the service (Everstine, 2015).

Leaving the military to join the airlines has always been an option for skilled naval aviators, but following September 11, 2001, the airlines stopped hiring at significant levels (Future and Active Pilot Advisors (FAPA), n.d.). According to FAPA, in 2001, civilian airlines hired 3,408 new pilots, yet from 2002 through 2004 new pilot hiring's totaled 851, 854 and 1,199 respectively, a significant decrease. It was only in 2014 that hiring's jumped above 3,000 again as revealed by FAPA and that number appears to be trending upward. The airlines are now dealing with their own retention problems as over the next decade, anywhere from 1,000 to 2,000 senior captains are reaching the age of 65 and being forced to retire due to FAA regulations (Airline Pilot Central, n.d.). With the possible shortage of civilian aviation students, the military's aviators are more than qualified to take over and the military must expect that some will look to make a change (Jansen, 2013). Not only can the airlines offer financial advantages over the military, there is also the fact that aviators who transition to the airlines can enjoy the benefits of a more stable home life that no longer requires moving around the country every three to four years. The airlines present the Navy with the potential for a major problem in retaining skilled aviators. This is a problem that needs to be addressed before it is too late. This thesis analyzes the differences in net present values (NPV) of potential career earnings for naval aviators who depart the service after completing the active duty service obligation (ADSO) (roughly 10 years of service time) and those aviators who depart the service after serving for 20 years, the traditional retirement point.

Not only do the NPV calculations consider two different exit points from the Navy, they also consider two different retirement systems. On January 1, 2018, the military's new blended retirement system will become operational. Top officials who monitor retention rates must now take into account how an aviator's new retirement plan may influence his or her financial incentives and changes.

While this study focuses on financial differences, it is important to remember that money is not the only factor that influences retention among naval aviators. Other

factors—such as family life, spouse employment opportunities, repeated cross-country moves, military bureaucracy and lack of flying opportunities as naval aviation careers progress—influence an aviator's decision to remain in the service or seek employment with the airlines. This study does not cover these topics and thus does not provide a perfect solution to counter airlines that may aggressively target military pilots as potential hires. What this thesis does provide is the financial facts to ensure that any discussion about retention and potential solutions will have a solid foundation in finance.

B. RESEARCH QUESTIONS

This thesis attempts to answer three main questions regarding naval aviation and commercial aviation:

1. Do naval aviators earn more money by transitioning to the commercial airlines after serving for 20 years or after serving until completion of their initial service obligation?
2. Will the implementation of the new retirement plan change the results from the first question?
3. If the Navy makes major changes to aviation career continuation pay (ACCP), will it impact the results from the first question?

C. ORGANIZATION

The rest of this thesis is organized in four chapters. Chapter II provides the background information necessary to understand the specifics behind a career in naval aviation and a career in the commercial airline industry. Chapter III explains the methodology behind the NPV calculations as well as the assumptions that were made regarding the inputs to the equations. Chapter IV shows the results of the calculations along with the sensitivity analysis that was conducted to determine the impact that change could make on some of the variables. Chapter V draws conclusions from data and makes recommendations for further study and research.

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II. BACKGROUND

A. CAREER EARNINGS

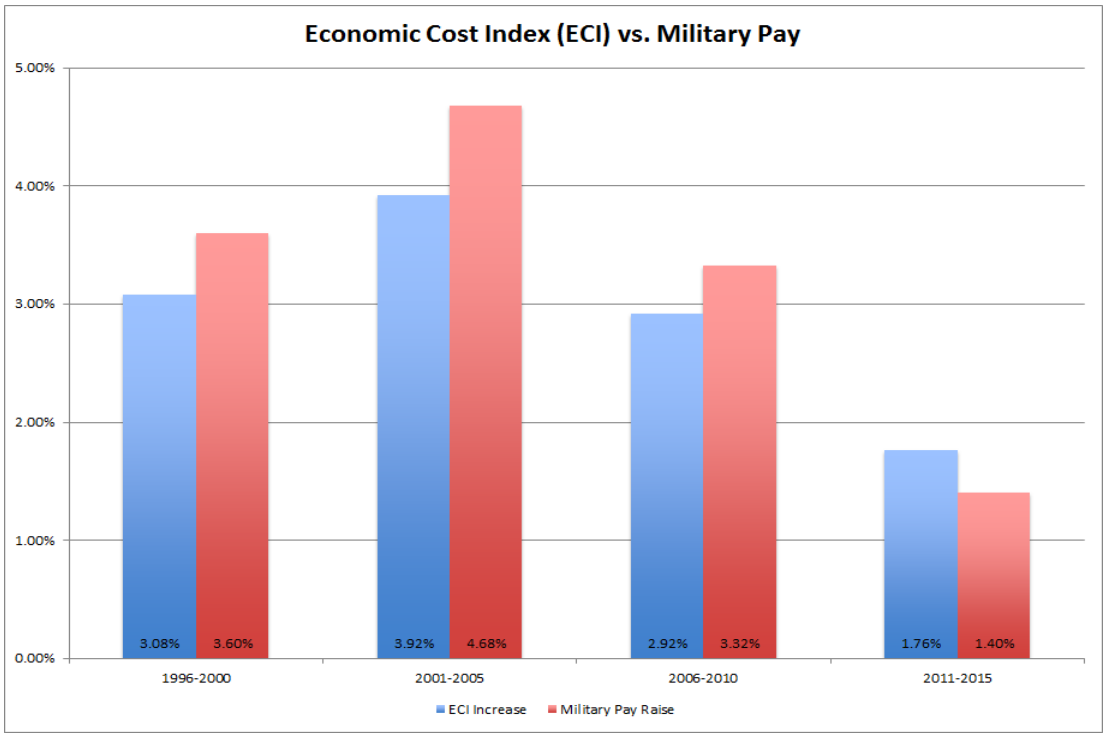
1. Naval Aviation

All members of the military are compensated financially for their service to their country. The military's compensation system is designed to be fair and competitive both internally with the services and with respect to the civilian sector (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Aviators are compensated in the form of basic pay, special and incentive pay, allowances and retirement, according to the Office of the Under Secretary of Defense for Personnel Readiness. When all elements are combined an aviator can determine their Total Military Compensation (TMC). Each element of an aviator's TMC is discussed in detail in this chapter.

a. Basic Pay

Basic pay is the most fundamental part of the military pay system and it also makes up the largest portion of an aviator's TMC (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). How much basic pay an aviator receives is a function of their rank and their time in service. Those two inputs can be used to enter the standard pay tables for all officers to determine their monthly basic pay. Members of the military are entitled to annual pay raises which results in new pay tables being released at the beginning of every calendar year (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). According to the Office of the Under Secretary of Defense for Personnel Readiness, pay raises are supposed to be based upon the Employment Cost Index (ECI). "The Employment Cost Index (ECI) measures the change in the cost of labor, free from the influence of employment shifts among occupations and industries" (United States Department of Labor, 2016). "The FY2000 National Defense Authorization Act (NDAA) directed that pay raises for 2000 through 2006 would automatically be one-half percent above the private-sector wage increases. Pay raises beginning in 2007 are equal to the increase in the ECI" (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Congress set the pay raises above private-sector

wages from 2000 to 2006 to make up for several years of the military pay scale lagging behind the civilian sector. Despite the specific language written in the FY2000 NDAA, Congress and the president are not required to follow this rule if they believe it is fiscally prudent to approve a different (higher or lower) pay raise(Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Figure 1 shows how the military's pay raises have compared to the civilian sector in recent years.



ECI increase is always the bar shown on the left in each year grouping.

Figure 1. Difference between military pay raises and ECI increases since 1996. Source: Hoff & Meizlish (2015).

b. Basic Allowance for Housing

Basic Allowance for Housing (BAH) is a non-taxed allowance that is designed to offset the cost of housing for military members not living in government-provided quarters (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). According to defense policy, BAH amount depends on a member's geographical location and rank and whether or not he or she has dependents. BAH rates are a direct reflection

of the cost of rental properties in different geographical areas and therefore members receive higher rates in more expensive places like San Diego or Washington, DC, when compared to places like Pensacola. BAH rates will fluctuate as economic conditions shift in an area and the rental market changes. Members currently living in a given area will benefit from rates increasing but will not be affected if rates drop (Office of the Under Secretary of Defense for Personnel Readiness, n.d.).

c. Basic Allowance for Subsistence

Basic Allowance for Subsistence (BAS) is provided to offset the costs of meals. Its origins can be traced back to when the military provided room and board (rations) to its members (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Defense policy stipulates BAS is only designed to offset the cost for the member and not their dependents if he or she has them. The rate offered for BAS is linked to the cost of food according to the government's policy. Each year BAS is adjusted by the U.S. Department of Agriculture's food cost index in relation to the change in the price of food. As of 2016, BAS for officers is $253.63 per month. Since BAS is considered an allowance, it is not taxed by the government (Office of the Under Secretary of Defense for Personnel Readiness, n.d.).

d. Aviation Career Incentive Pay

Aviation Career Incentive Pay (ACIP) is what is commonly referred to as "flight pay." Title 37, Chapter 5 U.S.C. § 301a is the legislation that provides ACIP for aviators as a financial incentive for officers to serve as aviators throughout a military career. Payments start once aviators actually begin to fly and log flight hours which occurs for the first time while at primary flight training. ACIP is only based on years of aviation service and not by rank (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Table 1 reflects the designated rates at which eligible aviators are payed. It is important to note that ACIP is considered taxable income and it is not increased yearly for inflation.

Table 1. ACIP rates for aviators. Adapted from Office of the Chief of Naval Operations (2010)

Years of Aviation Service as an Officer				
2 or less	Over 2	Over 3	Over 4	Over 6
$125	$156	$188	$206	$650
Over 14	Over 22	Over 23	Over 24	Over 25
$840	$585	$495	$385	$250

For aviators to ensure they continue to receive ACIP they must meet certain aviation gates. Aviators who have an Aviation Service Entry Date (ASED) after October 2, 1985 "must have performed at least 8 years of operational flying (96 MOF) within the first 12 years of aviation service for entitlement to continuous ACIP until the next gate at 18 years of aviation service" (Office of the Chief of Naval Operations, 2010, p. 4). It is safe to assume that those aviators who successfully screen for aviation department head (DH) will receive continuous ACIP up to the 18-year gate at a minimum.

e. Aviation Career Continuation Pay

Aviation Career Continuation Pay (ACCP) is what aviators commonly refer to as "the bonus." It was designed to be a retention tool to ensure highly skilled and experienced aviators remained on active duty to support the Navy's mission and maintain combat readiness (Office of the Chief of Naval Operations, 2005). In this section, ACCP is analyzed strictly as a form of compensation in order to correctly calculate an aviator's career earnings. The way the Navy utilizes ACCP as a retention tool is analyzed in a future section. The contract amounts described in Table 2 are the historical values that have been offered. From FY 99–10 all pilots received the same amount regardless of community, however, in FY 11, the Navy began to adjust the bonus amounts based upon specific community health (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015).

Table 2. Historical ACCP rates for aviators. Adapted from Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs) (2015).

	FY 99-10	FY 11	FY 12	FY 13	FY 14	FY 15
HM Pilot	$125,000.00	$ 50,000.00	$ 50,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00
HSC Pilot	$125,000.00	$ 50,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00
HSL/HSM Pilot	$125,000.00	$ 50,000.00	$ 25,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00
VAQ Pilot	$125,000.00	$ 75,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00
VAW/VRC Pilot	$125,000.00	$ 25,000.00	$ 50,000.00	$100,000.00	$125,000.00	$125,000.00
VFA Pilot	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00	$125,000.00
VP(P) Pilot	$125,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 75,000.00	$ 75,000.00
VQ(P) Pilot	$125,000.00	$ 50,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00
VQ(T) Pilot	$125,000.00	$ 25,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00	$ 75,000.00

f. Retirement

The military's retirement system is likely a major factor to be considered for aviators weighing the decision to remain in the service following their ADSO. The military's retirement plan has remained relatively unchanged over the past couple decades but in 2015, Congress approved a new format based upon recommendations from the Military Compensation and Retirement Modernization Commission (MCRMC). The new retirement plan will go into effect January 1, 2018, however aviators currently in the service will be grandfathered into the current system unless they desire to switch (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). For this reason, both systems have been briefly analyzed for computing TMC.

While the current pension type retirement plan has three variations (Final Pay, High-36 and CBS/REDUX), only High-36 is applicable to this study (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Final Pay is not applicable because it only applies to aviators who entered the service before September 8, 1980, according to the Office of the Under Secretary of Defense for Personnel Readiness, while CBS/REDUX is assumed to be a poor financial decision.[2] Only aviators who serve a minimum of 20 years are eligible for the High-36 pension. The payout is determined by multiplying the average of the aviator's highest three years of base pay times a multiple. The multiple is determined by multiplying 2.5 percent times the years of service. This

[2] CBS/REDUX offers eligible members a $30,000 bonus at year 15 of service but reduces the pension multiplier by one percentage point for each year less than 30 years at retirement. This study assumes aviators serve no more than 20 years, which cuts the pension from 50% to 40%.

forms the basis for the pension the aviator will receive after he or she retires. The pension is adjusted for inflation by Cost of Living Adjustments (COLA) based upon the Consumer Price Index (Office of the Under Secretary of Defense for Personnel Readiness, n.d.).

While the current retirement system is a Defined Benefit (DB) pension plan, the new system will be a Blended Retirement System. One of the main benefits of the new blended plan is that all aviators will receive benefits, not just those that serve for 20 years of more.[3] The new system is comprised of three components: Defined Contributions (DC), Defined Benefits (DB) and Continuation Pay (CP).

- For DCs, aviators will automatically be enrolled in the Thrift Saving Plan (TSP) with three percent of their basic pay going into the Roth type account. Only after the completion of financial literacy training can the member change the contribution amount or change the TSP account to a traditional type. Department of Defense (DOD) will contribute one percent of basic pay every month, vesting upon completion of two years of service. In addition, after four years of service, DOD will match up to five percent of basic pay in the TSP account (Office of Management and Budget, 2015).

- A DB annuity or pension is available for aviators who make it to 20 years of service with the difference being a two percent multiplier for all and a reduction to COLA less one percent for those who entered the service before January 1, 2014 (Office of Management and Budget, 2015).

- In response to potential retention impacts, aviators may be offered CP, which is a one-time retention payment determined by the individual services up to 22 times basic pay at 12 years of service (Office of Management and Budget, 2015).

2. Commercial Aviation

The commercial airline industry is broken up into several different segments to include legacy, major, regional, and cargo (Airline Pilot Central, n.d.). Airlines that are in the legacy category pay their pilots the most and for that reason they were the main focus

[3] Under the current DB retirement system, only about 17% of active duty service members receive retirement benefits (Military Compensation and Retirement Modernization Commission, 2015).

of the study.[4] The only major airline that can compete with the legacy airlines with respect to compensation is Southwest which justifies their inclusion in the study. In the cargo category, both FedEx and UPS are very similar with respect to financial compensation therefore only FedEx has been studied. No airlines from the regional category were analyzed because these airlines simply do not compensate their pilots well enough to be competitive with respect to this study.[5] The commercial airline industry compensates pilots in three main ways. These include hourly wages, retirement funds and profit sharing (Airline Pilot Central, 2006).

a. Base Pay

Unlike the military, the airlines do not pay their pilots a salary but instead pay them by the hour (Airline Pilot Central, 2006). There are two main inputs that determine the hourly wage of an airline pilot according to Airline Pilot Central. The first is the type of plane they fly. Airplanes are typically considered to be wide-body or narrow-body and pilots get paid more to fly a wide-bodied plane. The second is the position on the crew they hold, either captain or first officer (FO). New pilots start out as FOs and work their way up to captains if they desire. All of the FOs and captains are ranked by seniority to determine assignments (Airline Pilot Central, n.d.). The more senior pilots will get to be based out of the city they want and get to fly the specific routes they want which will prove to be very beneficial to their quality of life.

It is important to understand that the hourly pay rate is not based on the actual number of hours they work but the number of hours they fly. An airline pilot is not actually compensated for the hours they spend on the ground while the airplane is being pre-flighted and passengers and cargo are being loaded (Airline Pilot Central, 2006). During this time they are clearly working yet they are not compensated. Their compensation begins when the boarding door is closed and they begin to taxi and it ends

[4] The legacy airlines include Delta, United, American, Alaska and Hawaiian airlines (Airline Pilot Central, n.d.).

[5] Corvus Airlines was the best paying regional airline in 2015 and 2014. On average, their pilots were paid $106 and $97.25 respectively, almost half of the $203.50 hourly wage Southwest pilots receive (Airline Pilot Central, 2015).

when the flight is completed and they are back at the boarding gate. This type of system can result in two pilots both spending the same number of hours at work but each being paid for a different number of hours. For example, if a pilot shows up one hour before takeoff, flies 13 hours non-stop and then spends one more hour at work before going home, he or she will be paid for 13 hours of work despite spending 15 hours at work. Another pilot may show up one hour before takeoff, fly five hours to a layover destination, spend two hours on the ground and then fly six hours back to the origin and spend one hour at work before departing. This pilot would be paid for 11 hours despite spending 15 hours at work. This makes it much more advantageous for pilots to be assigned longer flights and that comes with seniority (Airline Pilot Central, 2006). Tables 3 and 4 show the average hourly wages pilots earned in 2015.

Table 3. Average hourly pay for pilots working for legacy carriers. Source: Airline Pilot Central (2015).

Airline	Average Pay (2015)	Average Pay (2014)	Lowest Pay	Highest Pay
American Airlines	$243.21	$182.94	$137	$299
United Airlines	$216.38	$209.40	$182	$263
Delta Air Lines	$208.11	$212.97	$128	$270
Hawaiian Airlines	$194	$186.47	$170	$207
Alaska Airlines	$186.67	$181.83	$174	$206

Table 4. Average hourly pay for pilots working for major carriers. Source: Airline Pilot Central (2015).

Airline	Average Pay (2015)	Average Pay (2014)	Lowest Pay	Highest Pay
Southwest Airlines	$203.5	$203.50	$191	$216
Virgin America	$176.17	$148.42	$160	$189
JetBlue Airways	$174.42	$169.64	$131	$195
Spirit Airlines	$149.87	$149.87	$102	$185
Allegiant Air	$148.42	$141.42	$138	$160
Frontier Airlines	$136.64	$136.64	$111	$156
Sun Country Airlines	$131.07	$98	$100	$164

The amount of time it takes for a FO to promote to captain can vary at each airline and some pilots may chose to remain FOs because they would rather be a senior FO than a junior captain (AvJobs, n.d.). This means they will earn less but they will have the advantage of getting top pick on routes and home locations over the other FOs instead of getting the least desirable routes and locations as a junior captain.

Every major airline has a union that represents the pilots (Union Facts, 2014). These unions are supposed to look out for the best interest of the pilots though this can vary from person to person. One of the main benefits of unions as listed by Union Facts is that they protect and defend pilots from any type of behavior by the airline that is deemed to be unjust. Almost all pilots join the union after they are hired. In 2013 according to Union Facts, there were over 48,551 members in the pilots union. The cost of this membership is 1.95 percent of their income each year which can add up as pilots gain seniority and thus it must be accounted for when calculating their compensation (Union Facts, 2014).

b. Retirement

Historically, the airlines have offered two types of retirement plan, the A plan and the B plan (Airline Pilot Central, 2007). As described by Airline Pilot Central, the A plan is a defined benefit pension plan meaning that when pilots retired they would receive a pension for the rest of their lives. FedEx and UPS, both cargo carriers, are the only two

airlines that still offer these types of plans. Airline Pilot Central describes B plans, more specifically called Money Purchase Pension Plans, as a defined contribution type of plan. All the legacy airlines offer a B type plan to include FedEx and UPS as their pilots receive both types of retirement plans (Airline Pilot Central, 2007).

The A plan uses a set percentage and a maximum number of years to define what a pilot can expect to receive in benefits when they retire (Airline Pilot Central, 2007). For example, FedEx sets their percentage at two percent and the maximum number of years at 25. This means a pilot who works at FedEx can expect to receive 50 percent (two percent time 25 years) of their high five years pay. These plans are usually capped at an upper limit and FedEx set its limit for the maximum pay at $260,000 which means the most a pilot can expect to receive in defined benefits is $130,000.[6] UPS offers a similar plan yet uses different percentages.

The more common B plan is what most airline pilots can expect to receive in retirement (Airline Pilot Central, 2007). The B plan is similar to a 401k that allows contributions to be made by both the pilots and their employers. Each airline manages the B plan differently. According to Airline Pilot Central, some airlines will make an automatic contribution based on a set percentage of the pilots pay without requiring the pilot to make any contributions at all. Even though they are not required to make contributions, pilots are able to make contributions if they desire.[7] Financially, this is the most rewarding plan as the pilot gets to keep their whole pay check and at the same time receive retirement benefits. The other type of B plans described by Airline Pilot Central requires the pilot to make a contribution first and then the airline will match it up to a certain preset percentage. In all of the B plans offered by the airlines, the pilots are vested immediately (Airline Pilot Central, 2007).

[6] Specifics regarding FedEx's A plan were communicated via email from former military pilot now employed by FedEx as a first officer.

[7] The IRS limits the maximum amount of direct contribution plans to $53,000 and employer contributions are limited to a maximum salary of $265,000 (Internal Revenue Service, 2015).

c. Profit Sharing

Profit sharing is a type of bonus that pilots can earn when the airline they work for hits a certain benchmark in profits for the year. Many of these benchmarks are tiered meaning pilots will earn increasing percentages as profits hit higher and higher benchmarks (McIntyre, 2015). Profit sharing can be a hot topic when it is time for the airlines to renew their contracts with the pilot unions. The issue with profit sharing is that when the economy is good, pilots are compensated with very large bonuses. When the economy is down, airlines do not generate as much net income and profits which results in smaller profit sharing bonuses for the pilots. This variability, according to McIntrye, makes it difficult for pilots to be able to accurately project future earnings but many pilots prefer higher profit sharing rates instead of higher hourly wages and lower profit sharing rates. Delta recently paid out $1.1 billion in profit sharing to its employees with each person earning a bonus of about 16 percent of their annual compensation, roughly two months' pay (Zhang, 2015). Delta also recently proposed a new labor contract that would offer a pay increase of 14.5 percent along with an increase in 401k contributions but it would lower the profit sharing rates. The pilots rejected the contract proving how much they value the potential for earning very large bonuses when the companies are profitable which many are proving to be (McIntyre, 2015).

B. NAVAL AVIATION RETENTION

1. Historical Trends

In 2008, N10, the Manpower, Personnel, Training, and Education (MPTE) Resource Management Division sponsored CNA to conduct a study on officer retention, particularly aviators with 7 to 12 years of commissioned service, the critical stay or leave time frame (Daly et al., 2008). In their study, they determined that not all aviation communities were recording retention data the same way which resulted in non-standard data being sent to higher authorities. The end result of the study was a standardized way for communities to report cumulative continuation rates (CCR). The resulting CCRs are used to give senior members of the military a better understanding of the health of each

community and if changes need to be made. Table 5 shows the historical CCRs for aviation as a whole as well as for each community.

Table 5. Historical aviation CCRs. Adapted from NPC PM, personal communication, March 2016.

FISCAL YEAR	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	1st QTR FY16
QUAL PILOTS	**25.7%**	**38.7%**	**30.9%**	**36.3%**	**48.7%**	**52.8%**	**44.6%**	**42.9%**	**46.2%**	**42.2%**	**52.8%**	**49.1%**	**52.5%**	**67.5%**	**55.2%**	**50.4%**		**43.9%**
JET PILOTS	27.8%	41.0%	27.6%	32.7%	61.5%	56.0%	45.6%	46.6%	43.5%	45.7%	54.8%	56.8%	59.8%	68.9%	55.9%	52.6%		**46.4%**
VFA (F/A-18)	32.0%	41.6%	28.3%	42.2%	70.9%	65.8%	51.9%	56.4%	48.8%	47.4%	58.1%	63.5%	66.2%	69.2%	57.7%	56.9%		**46.9%**
(EA-6B, EA-18G)	48.1%	38.7%	39.9%	45.7%	75.0%	62.2%	52.5%	51.4%	35.6%	56.3%	55.8%	55.9%	65.6%	65.6%	68.6%	56.9%		**43.1%**
VAW (E-2C)	15.0%	40.5%	28.3%	13.0%	35.0%	37.1%	47.5%	42.8%	47.4%	47.3%	44.8%	39.1%	44.3%	66.9%	45.8%	40.7%		**46.3%**
PROP PILOTS	15.3%	31.8%	16.3%	19.3%	30.6%	39.2%	29.0%	24.0%	39.0%	30.1%	37.2%	38.2%	44.4%	62.4%	44.7%	50.1%		**35.2%**
VP (P-3)	14.9%	30.9%	15.8%	21.6%	29.0%	37.8%	27.4%	22.4%	33.9%	30.0%	36.1%	37.6%	43.2%	62.9%	47.9%	47.7%		**35.1%**
VQ PROP (EP-3)	14.2%	22.0%	16.7%	15.4%	32.1%	44.0%	36.7%	35.2%	68.5%	23.2%	41.8%	38.1%	42.8%	65.2%	49.7%	49.1%		**20.9%**
VQ TAC (E-6A/B)	12.5%	38.5%	19.2%	10.2%	32.4%	39.6%	29.6%	16.8%	44.9%	37.7%	40.6%	39.2%	48.2%	56.8%	25.8%	72.2%		**55.4%**
HELO PILOTS	30.6%	39.0%	43.0%	46.3%	43.0%	59.2%	59.0%	51.2%	47.6%	44.6%	56.3%	53.0%	53.5%	69.9%	60.0%	49.3%		**47.1%**
HSL/HSM (H-60)	29.3%	35.8%	42.1%	49.0%	44.6%	58.7%	56.5%	58.6%	52.0%	42.7%	63.0%	51.1%	52.9%	72.5%	67.1%	46.0%		**49.6%**
H-60, H-46, H-53)	30.2%	45.5%	43.9%	45.3%	39.8%	57.4%	62.3%	44.2%	44.4%	47.7%	48.2%	53.1%	52.7%	66.2%	55.9%	49.0%		**44.2%**
HM (H-53)	28.5%	20.9%	50.0%	21.5%	30.0%	51.9%	54.7%	64.2%	36.6%	36.5%	51.4%	62.3%	58.6%	74.1%	40.0%	49.9%		**34.6%**

2. Airline Hiring Trends

When the historical naval aviation CCRs are converted from retention rates to attrition rates, there is the appearance of a relationship between them and airline pilot hiring trends as illustrated in Figure 2.

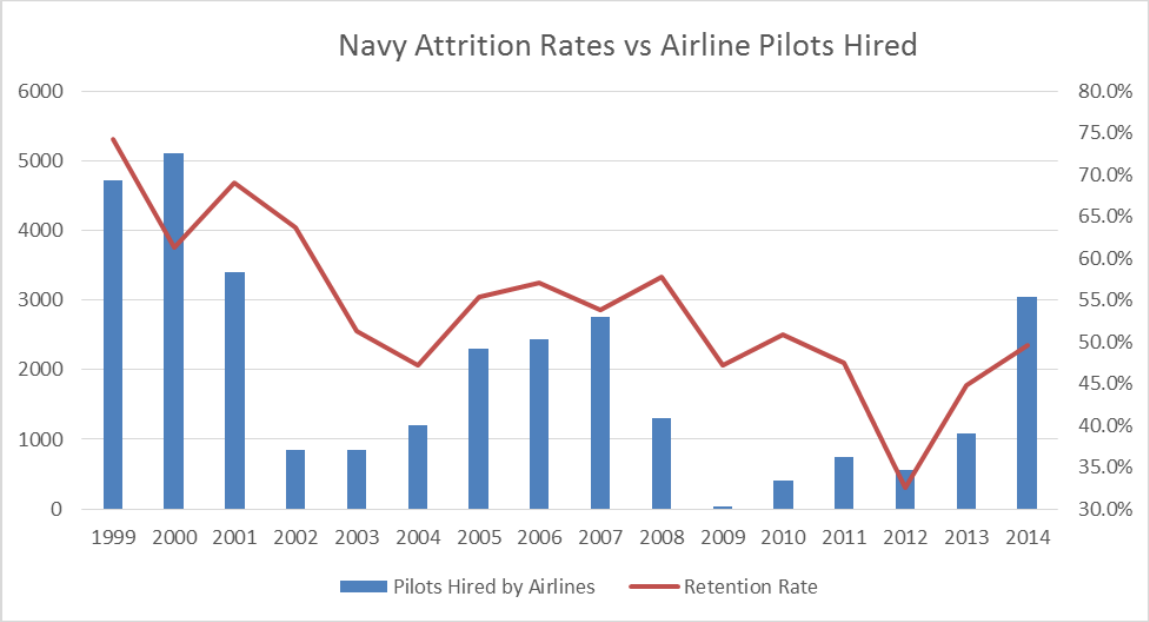


Figure 2. A comparison of Navy pilot attrition rates versus airline hiring rates. Adapted from Future and Active Pilot Advisors (n.d.).

In 2014, the Government Accountability Office (GAO) conducted a study to analyze the projected shortage of commercial airline pilots. GAO looked at four different studies that suggested the need for an average of a few thousand new pilots per year over the next decade. The following are the studies and projections GAO analyzed:

- Audries Aircraft Analysis: Their pilot demand forecast was based on aircraft manufacturers' forecasts of fleet growth. Embraer's forecast projected about 2,900 new pilots per year, Airbus projected 3,900 new pilots per year and Boeing projected 3,300 new pilots.
- University of North Dakota Academic Study: Their study focused on growth, both positive and negative as its basis. Positives were overall growth of the airline industry and negatives were pilot retirements and

attrition. The study estimated 95,000 new pilots would be required over the next 20 years, with about 45,000 over the next decade (4,500 per year).

- FAA 2013 Forecast: Their forecast was based on projected passenger demand with an expected growth of 2.2 percent per year through 2033. This type of growth would require 70,000 new pilots through 2032, which equals an average of 3,400 new pilots per year over the next decade.

- Bureau of Labor Statistics Employment Projections 2012–2022: Their study was focused on expected occupational growth. Based on employment projections, they calculated that an average of 440 pilot jobs would be lost annually through 2022, however, during that same time period there would be 19,200 job openings, an average of 1,920 per year due to retirements and attrition.

From the four studies' results, the GAO estimated the range of new pilots required to be between 1,900 and 4,500 (Government Accountability Office, 2014). Table 6 shows how many pilots will be required to retire each year for the next decade if the mandatory retirement age remains at 65.

Table 6. Future mandatory retirements by major airlines. Adapted from Airline Pilot Central (n.d.).

Year	Delta	United	American	FedEx	Total
2016	225	371	135	149	880
2017	286	431	190	186	1093
2018	415	413	300	184	1312
2019	513	424	418	150	1505
2020	602	427	535	180	1744
2021	789	509	580	208	2086
2022	851	470	647	211	2179
2023	809	552	704	223	2288
2024	805	491	717	229	2242
2025	713	600	713	218	2244

3. ACCP As a Retention Tool

ACCP was implemented in order to retain aviation trained officers who are required to support the Navy's mission and maintain combat readiness (Office of the Chief of Naval Operations, 2005). The Navy realized that training aviators requires extensive time and resources and therefore demands that retention of them be a top priority. ACCP is governed by congressional legislation and U.S. Navy instruction. Title

37 U.S.C. §301b authorizes the Secretary of the Navy to pay aviation officers a maximum retention bonus of $25,000 per year if the aviation officer meets the following criteria:

- is entitled to ACIP;
- is in a pay grade below O-7;
- is qualified to perform operational flying duty; and
- has completed any active duty service commitment for undergraduate aviator training or is within one year of completing such commitment. (U.S. Congress, 2016)

The Navy follows congressional guidance as well as their own instruction, OPNAV Instruction 7220.9 for matters concerning ACCP. This instruction gives the Commanders, Navy Personnel Command, Aviation Officer Assignments Branch (PERS-43) the ability to evaluate, accept, and administer all ACCP contracts assuming the contracts meet all congressional requirements defined above and the following:

- is not subject to mandatory separation from active service within one year from the date ACCP would be paid;
- has not twice failed to select for promotion to the next higher pay grade, unless selected for continuation;
- if, having transitioned from Naval Flight Officer (NFO) to pilot, has completed the service obligation incurred during pilot training; and
- is recommended for ACCP by his or her Commanding Officer. (Office of the Chief of Naval Operations, 2005)

Every year the Navy releases a Naval Administrative Message (NAVADMIN) discussing the specifics of the ACCP for that year. The message defines candidate eligibility, the dollar amounts being offered per community, how to apply, and when applications are due. Each Aviator has a two-year window in which they are eligible to apply for ACCP (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015).

The first year they are eligible is called the early eligibility period (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015). Aviators hit this

period when they are in the fiscal year prior to the expiration of their service obligation. If they apply for and are accepted they will receive the bonus amount listed in the NAVADMIN in six annual installments. They will also incur a five-year service obligation beginning when they have completed their initial obligation and they also consent to being screened for DH and to accept DH orders if they are selected (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015).

The second year they are eligible is called the initial eligibility period (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015). Aviators hit this period when they are in the fiscal year following the expiration of their initial service obligation. If they apply for and are accepted they will receive the bonus listed in the NAVADMIN in five annual installments. They will also incur a five-year obligation from the time their ACCP application is approved by PER-43 and they consent to being screened for DH and to accept DH orders if they are selected (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015).

One of the unique factors of the ACCP program is that as long is an aviator meets the eligibility requirements previously defined their application will be accepted and they will begin receiving annual bonus payments (Office of the Under Secretary of Defense for Personnel Readiness, n.d.). Bonus payments will stop however if an aviator fails to select for promotion to O-4 or fails to screen for DH. The Office of the Under Secretary of Defense for Personnel Readiness lists other reasons that payments can stop but these are the two most common ones. In the event payments stop, aviators are still entitled to keep what they have already been paid by the Navy. This usually leads to the Navy paying out more than is required to fulfill annual DH requirements (Office of the Under Secretary of Defense for Personnel Readiness, n.d.).

Currently, the Navy has projected that aviation DH requirements for both operational and training squadrons will be approximately 330 pilots and NFOs through FY-18 (Kelso, 2014). During the FY-16 DH board, there were 447 eligible aviators competing for 300 total DH slots (Navy Personnel Command, 2015). This means that 147 aviators were receiving bonus payments and were not selected. Due to timing, a majority of them will have received two payments already and some possibly three payments. In

FY 13, the Navy spent $5,325,000 in bonus payments on aviators (pilots and NFOs) who were either not selected for O-4 or not selected for DH (Kelso, 2014). The average amount the Navy pays is nearly $4.5 million in ACCP to retain aviators who will not complete DH tours; this is money the Navy could spend to compensate aviators and help to prevent possible retention issues.

III. METHODOLOGY AND ASSUMPTIONS

This chapter explains how each calculation was performed and the reasons behind the choice. It also explains what each variable represents in the calculations along with all the assumptions that were made and the justifications behind them.

A. METHODOLOGY

When comparing career earnings for Navy pilots and airline pilots, values are spread across several years and must be accounted for accurately. Money is not valued the same in future years or past years. For these reasons the following calculations were used: Present Value (PV), Future Value (FV) and NPV.

1. Present Value and Future Value

The PV and FV formulas are used in finance to calculate the present day value of any money that will be received in the future and the FV of money earned in the present. Financial managers explain this concept when they say "money has a time value or when they quote the most basic principle of finance: a dollar today is worth more than a dollar tomorrow" (Brealey, Myers, & Allen, 2011). The time value concept means that a certain amount of money today is not worth the same amount at a future date, i.e., $100 today is not worth $100 in one year from now because of growth due to interest. Formulas are needed to quantify the differences between present money and future money. Thus, the following formulas are used to convert money between the present and the future:

$$PV = \frac{C_1}{(1+r)^n} \qquad FV = C_0 \times (1+r)^n$$

$C_1 = Cash\ Flow\ at\ period\ 1$
$r = rate\ of\ return$
$n = number\ of\ periods$

$C_0 = Cash\ Flow\ at\ period\ 0$
$r = rate\ of\ return$
$n = number\ of\ periods$

(Brealey, Myers, & Allen, 2011)

2. Net Present Value (NPV)

"NPV is defined as the difference between the present value of cash inflows and the present value of cash outflows" (Brealey, Myers, & Allen, 2011). NPV is typically used as a finance tool to analyze profitability among different projected investment proposals. A positive NPV means a proposed project will be profitable and a negative NPV means it will lose money. This study is using NPV to determine which career path is most profitable by attempting to find the highest NPV.[8] The following equation is used to calculate NPV:

$$NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_o$$

C_t = net cash inflow during the period t

C_o = total initial investment costs

r = personal discount rate, and

t = number of time periods

(Brealey, Myers, & Allen, 2011)

B. ASSUMPTIONS

This study required several assumptions to be made to complete calculations and develop solutions. All assumptions are explained in later chapters.

1. Calculations

The NPV calculations required assumptions to be made for return rates and discount rates.

[8] NPVs are used in this study as a comparison tool, not an actual dollar amount expected to be earned. The value gained from the NPV equations will be in the difference between two NPVs, which will show how much more valuable one option is over the other.

a. Rate of Return

When the new retirement plan goes into effect in 2018, one of the requirements in determining career compensation for naval aviators will be determining the value of the defined contributions made by the Navy. Defined contributions will utilize the TSP and will require a return rate to be estimated. In order to provide a reasonable return rate that approximates the historical S&P 500 return, the retirement commission used the TSP Life cycle 2050 Fund (L2050) along with its historical 7.3 percent average return (Military Compensation and Retirement Modernization Commission, 2015). The Life cycle fund is spread across the G, F, C, S, and I Funds to provide diversification and is adjusted over time to meet changing risk profiles.[9] When combined with the assumed 2.35 percent interest rate, the real rate of return is 4.95 percent according to the MCRMC. In agreement with the retirement commission, the L2050 Fund is used for the DC and CP portions of this thesis (Military Compensation and Retirement Modernization Commission, 2015).

b. Personal Discount Rate

Experimental and non-experimental studies have been done to measure the personal discount rate, which is the rate at which an individual will trade a current dollar for a future dollar. Included in these studies is an examination of the early 1990s military drawdown and the introduction of the Voluntary Separation Incentive and the Selective Separation Benefit (Warner & Pleeter, 2001). Warner and Pleeter evaluated the behavior of service members who were given a choice to have money in hand at the expense of their annuity. The results of the program were not what was expected as the "take rate" was far above the projected rate.

The behavioral economic community has determined there are three elements to the personal discount rate (r):

- Individuals do not discount all future values at the same rate

[9] The G, F, C, S and I funds are specific TSP funds in which members can. The lifecycle fund makes investments into all of them much like a mutual fund does with individual stocks (Thrift Savings Plan, n.d.).

- r varies with the time delay of the reward or penalty
- r varies with personal characteristics

The MCRMC and RAND use a personal discount rate of 6.4 percent for officers. This assumption is accepted for the purpose of this study because the three elements used to determine the personal discount are assumed to be fairly consistent across the officer corps and it would be beyond the scope of this thesis to treat every officer different.

c. Inflation

For the purposes of this thesis, the interest rate of 2.35 percent per year used by the MCRMC is assumed.

2. Naval Aviator Compensation

All naval aviators were assumed to start their careers in 2016 at the age of 22 and their compensation was based off of 2016 pay charts. All earnings were discounted back to the end of their 10^{th} year of service which corresponds to an age of 32. This is the major decision point in a naval aviator's career; they will either stay Navy or transition to the airlines. All future career earnings will be discounted back to this point for comparison purposes.

a. Age and Life Expectancy

Using the assumption that the majority of officers enter the military at age 22, the retirement age at the 20-year mark is 42 years old. The Office of the Actuary publishes gender specific life expectancy charts for enlisted and officer members that use retirement age as an independent variable (Office of the Actuary, 2015).

Following the life expectancy chart for the assumed retirement ages and using a weighted average of the gender demographics of the enlisted and officer population within DOD yields the following:

Officer: (83.3% x 84.3yo)[10] + (17.7% x 85.9yo)[11] = 84.6 years old

[10] Male officers

[11] Female officers

b. Promotions

Navy Personnel Command's (NPC) community brief for Aviation Officers charts an aviator's career progression. This was used to determine at what point aviators would promote to O-4 and O-5 as shown in Table 7 (Navy Personnel Command, n.d.b).

Table 7. Naval aviators' projected ranks over time. Adapted from Navy Personnel Command (n.d.b).

Year	1	2	3	4	5	6	7	8	9	10
Rank	O-1	O-1	O-2	O-2	O-3	O-3	O-3	O-3	O-3	O-3
Year	11	12	13	14	15	16	17	18	19	20
Rank	O-4	O-4	O-4	O-4	O-4	O-4	O-5	O-5	O-5	O-5

c. Military Pay Raise

There is not a predetermined rate for the military's annual pay raise. From 2011 to 2015, the average pay raise was 1.4 percent (Hoff & Meizlish, 2015). This number was used when applying a pay raise for future earnings.

d. Basic Allowance for Housing (BAH)

The BAH rate used in the calculations was based upon 2016 rates with dependents. While all aviators do not have dependents, using the dependent rate was the better of the two options because it showed the maximum potential dollar amount available when calculating the differences between career earnings for an aviator who serves until their initial obligation expires and one who serves until retirement. There is also not an exact way to average BAH across many cities; the cities and rates shown in Table 8 were used because they are the most common cities in which aviators are stationed.

Table 8. Projected Navy BAH rates for aviators. Adapted from Defense Management Travel Office (2016).

Rank	Norfolk, VA	Jacksonville, FL	San Diego, CA	Whidbey Island, WA	Average
O-1	$1,641.00	$ 1,542.00	$ 2,325.00	$ 1,206.00	$ 1,678.50
O-2	$1,749.00	$ 1,764.00	$ 2,451.00	$ 1,410.00	$ 1,843.50
O-3	$1,860.00	$ 1,848.00	$ 2,706.00	$ 1,719.00	$ 2,033.25
O-4	$2,085.00	$ 2,085.00	$ 2,943.00	$ 1,938.00	$ 2,262.75
O-5	$2,247.00	$ 2,259.00	$ 3,117.00	$ 2,097.00	$ 2,430.00

e. Aviation Career Continuation Pay (ACCP)

The FY15 ACCP message listed total bonus amounts for aviators as either $75,000 or $125,000 (Office of the Assistant Secretary of Navy (Manpower and Reserve Affairs), 2015). Calculations were performed with the bonus set at both amounts to perform sensitivity analysis.

f. Tax Incentive

Naval aviators were given a tax savings during their military careers because both BAS and BAH are non-taxed allowances. This fact in conjunction with the fact that commercial aviators are not given a tax-free housing allowance means that a 15 percent tax savings was given only to BAS and BAH to ensure career earnings were calculated correctly and fairly.

g. Blended Retirement Plan

The Navy's new blended retirement plan will consist of CP, DCs and DBs for those eligible.

(1) Continuation Pay (CP)

The Final Report for the military's new blended retirement plan released by the MCRMC determined that the CP multipliers displayed in Table 9 would be required to maintain the current force structure (Military Compensation and Retirement Modernization Commission, 2015). It was also assumed by the MCRMC that each service would have flexibility to increase CP to incentivize retention as needed. The calculations in this study used a multiplier of 15 for determining career earnings.

Table 9. CP multipliers by service. Source: Military Compensation and Retirement Modernization Commission (2015).

	Enlisted		Officer	
	AC	RC	AC	RC
Army	2.8	0.9	13.0	6.2
Marine Corps	4.2	1.1	11.7	5.8
Navy	4.8	1.2	15.2	6.7
Air Force	2.4	0.8	15.9	6.4

(2) Defined Contributions

It was assumed that aviators would be financially wise and make a minimum contribution of five percent annually to their TSP accounts. Based on the MCRMC report, it is assumed that aviators will automatically receive one percent the first four years of service and then receive the maximum matching contribution of five percent for the remainder of their careers. There is a chance some aviators will invest more but only five percent is relevant based upon the governments matching policy.

It was also necessary to reduce each aviators take home compensation during the NPV calculations because they must make a contribution to TSP to receive matching funds from the government. This reduction was not made for most of the commercial airline retirement contributions because their pilots do not have to make individual contributions to their retirement accounts to receive the automatic employer contributions.

(3) Defined Benefits

It is assumed that aviators eligible for defined benefits will receive a pension equivalent to 40 percent of the average pay over the three highest pay periods. This assumption is based on them serving 20 years in the Navy and not staying past that point.

h. Types of Compensation Left Out

All the major forms of compensation for naval aviators were included in this study but some of the minor ones were left out. All forms of deployment specific compensation such as sea pay, hazard duty pay, imminent danger pay, tax free pay, family separation pay, per diem, were left out because deployments are not consistent among different aviation communities. The command bonus was also left out because it requires those who receive it to commit to remain in the service to the 22-year mark, which is outside the scope of this study.

3. Commercial Airline Pilot Compensation

a. Career Progression

Airline pilots have unpredictable career promotions. Some of the unpredictability is due to individual pilot preferences and some of the unpredictability is due to the needs of the airline (Airline Pilot Central, n.d.). For comparison purposes it was necessary to make a standard career progression where one does not exist. It was assumed that all pilots in this study would have aspirations to promote from FO to captain and this promotion would take eight years on average. It was also assumed that all pilots would start their careers flying narrow-bodied aircraft and move up to wide-bodied aircraft. They would make this transition both as FOs and as captains. For these reasons, the monthly pay rates were sequentially stepped up to account for promotions to larger aircraft and the promotion to captain. It was also assumed that all airline pilots would fly until the mandatory retirement age of 65, which would remain constant.

b. Airline Specifics

Calculating career earning while flying for a commercial airline required many assumptions to be made regarding the following categories: Minimum flight hours guaranteed, average flight hours flown, projected pay raises, retirement fund matching and profit sharing rates. Table 10 lists the rates that were used for each category.

Table 10. Inputs to airline compensation. Adapted from Airline Pilot Central (n.d.).

Airline	Minimum Hours	Average Hours	Projected Pay Raise	Retirement Fund Match	Profit Sharing
Delta	65	80	3%	15%	10%
United	70	80	2.5%	16%	13%
American	73	80	3%	16%	10%
Southwest	78	80	3%	9.3%	3%
FedEx[12]	74	80	3%	8%	0%

The numbers in Table 10 were used to calculate career earnings but it is extremely unlikely these numbers would remain constant over an entire career.

c. Compensation Left Out

When calculating career compensation for airline pilots not all forms of income were accounted for. Each pilot receives a set hourly rate but those hourly rates can actually be slightly higher than what was used in this study. On top of the rates used here, pilots also receive per diem which is usually around $2.00/hr domestic and $2.50/hr internationally. These were left out because they cannot be accurately accounted for and because per diem was not used in the Navy compensation either. Airline pilots can also receive International Override Pay when they fly routes which require special qualifications. This pay can increase their hourly rate by $4.50/hr for FO's and $6.50/hr for Captains. This was not included because there is no way to accurately determine who is receiving it and how often. These are two forms of compensation that all airlines offer but other airline specific pays include Ultra Long Range override and night override pays (Airline Pilot Central, n.d.).

4. Calculating Career Earnings

Career earnings were calculated for two different scenarios. The first scenario involves naval aviators who separate after their initial commitment and begin flying for the airlines. These aviators will be referred to as veterans. The second scenario involves a

[12] FedEx does not have profit sharing and has the lowest retirement fund match but they are the only airline to offer a defined benefit pension on top of what is listed above.

naval aviator who separates after retirement and begins flying for the airlines. This aviator will be referred to as a retiree.

a. Veteran Career Earnings

The following components are used to calculate the veteran's career earnings: Navy take home compensation, airline take home compensation and retirement fund.

1. Navy take home compensation consists of the sum of annual base pay, annual flight pay, annual BAS, annual BAH, and tax incentive. Navy take home compensation is adjusted annually for inflation and then each year is discounted back to age 32 (10 years of service) using the personal discount rate and NPV equation.

2. Airline take home compensation consists of the sum of yearly salary and profit sharing and then subtracts annual union dues. Airline take home compensation is adjusted annually for inflation and then each year is discounted back to age 32 (10 years of service) using the personal discount rate and NPV equations.

3. The retirement fund consists of the TSP account from service in the Navy which is then rolled into the airline retirement fund. It is assumed that contributions are made to the retirement fund until the age of 65 when the veteran retires from the airlines. The value of the retirement fund only accounts for employer contributions; employee contributions are accounted for in take home compensation. The total value of the retirement fund at the age of 65 is discounted back to age 32 (10 years of service).

b. Retiree Career Earnings

The retiree's career earnings consist of the same inputs and calculations as the veteran but also includes a lifelong pension from the Navy. The pension begins when the retirees Navy career ends and airline career begins. The pension is adjusted annually for inflation and it is anticipated that it will be received from age 42 until age 85, the assumed life expectancy for officers. The annual values are discounted back to age 32 (10 years of service) using the personal discount rate.[13]

[13] Pilots who are employed by FedEx are also eligible to receive a pension upon retirement from FedEx (Airline Pilot Central, n.d.). This pension is calculated and discounted in the same manner as the military pension.

IV. RESULTS AND ANALYSIS

When performing the calculations for career earnings, results were separated into two main categories consisting of naval aviators who fall under the DB retirement plan and those who fall under the blended retirement plan. Aviators who enter the service on January 1, 2018 or later will fall under the blended plan. Aviators who joined prior to that date will fall under the DB plan but have the option to switch to the blended plan if they have completed less than 12 years of service.

A. DEFINED BENEFIT RETIREMENT PLAN

Naval aviators falling under the DB retirement plan were analyzed based on two possible career options in the Navy. One option was to serve until completing their ADSO and then separate and join the airlines; these aviators are considered veterans. The other option was to serve in the Navy for 20 years and retire. Following retirement, these aviators will join the airlines. These aviators are considered retirees.

1. Inputs to Calculations

At the age of 32 following roughly 10 years of service, naval aviators have the choice to stay in the Navy or separate. The following are the inputs that were used to calculate the net present value of these two career options at that time. The inputs listed in Tables 11, 12 and 13 are described in detail in Chapter III.

Table 11. Common inputs to all calculations.

Inflation Rate	2.35%
Rate of Return	7.30%
Personal Discount Rate	6.40%

Table 12. Navy-specific inputs.

Projected Annual Pay Raise	1.4%
ACCP Bonus (total amount)	$125,000
Tax Incentive	15%

Table 13. Airline-specific inputs.

	Southwest	Delta	American	United	FedEx
401k Automatic Contribution	9.3%[14]	15%	16%	16%	8%
Projected Pay Raise	3%	3%	3%	3%	3%
Avg. Hours Flown	80	80	80	80	80
Union Dues	1.95%	1.95%	1.95%	1.95%	1.95%
Profit Sharing	10%	10%	10%	13%	0%
Min Hours Guaranteed	78	65	73	70	74

[14] Southwest's 401k contribution is not automatic, it is a matching contribution that depends on how much each pilot contributes (Airline Pilot Central, n.d.). For this study, it is assumed that each pilot will ensure the maximum allowable contributions are made.

2. NPV Results

Using the inputs from Tables 11–13, NPVs were calculated and are displayed in Table 14.

Table 14. NPV results at age 32.

Age	Navy Career	Airline	NPV
32	Veteran	Southwest	$2,417,189.78
32	Retiree	Southwest	$2,681,112.13
32	Veteran	American	$3,430,938.32
32	Retiree	American	$3,092,672.52
32	Veteran	Delta	$3,082,557.48
32	Retiree	Delta	$2,949,029.08
32	Veteran	United	$3,582,646.08
32	Retiree	United	$3,159,940.05
32	Veteran	FedEx	$3,272,818.90
32	Retiree	FedEx	$3,175,558.10

The NPVs represent a present day value for what an aviator could expect to earn depending on which career path he or she follows and which airline they chose to fly for. It is important to remember that NPV is not the exact amount of money that will be earned but instead is an analytic construct. NPV is a tool for comparing different cash flows to determine which one is the most profitable if all the assumptions hold true. In Table 14, the United/Veteran option proves to be the most valuable followed by American/Veteran and FedEx/Veteran. The least valuable option is Southwest/Veteran followed by Southwest/Retiree. The big takeaway here is that the veteran option for the Navy career is the most profitable and Southwest as a whole (veteran and retiree options) is the least profitable.

The difference between NPV's for both Navy career options as shown in Table 15 reveals that if an aviator is making a purely financial decision, it is more valuable to separate from the Navy after finishing their initial commitment for all employment opportunities except for Southwest. In the case of employment at Southwest, it is financially smarter to remain in the Navy until retirement. There is also a clear distinction that United and American are above both Delta and FedEx. The reason Delta is ranked

lower is mainly due to lower hourly pay rates because Delta shares almost identical inputs with United and American. FedEx is lower because of its retirement plan. It offers a lower 401k automatic contribution than the others but additionally it offers a DB pension the others do not. While this does provide value, there is not any growth with it like a 401k and the pilots do not receive it until later in life (age 65) and thus a lot of the pension's value is discounted away with the 6.4 percent personal discount rate.

Table 15. Veteran NPV minus Retiree NPV.

Airline	Amount
SW	($263,922.35)
Delta	$133,528.41
United	$422,706.03
American	$338,265.79
FedEx	$97,260.80

Each calculation above was done with the assumption that naval aviators that separated as veterans did not serve in the reserves. For those aviators who chose to serve in the reserves while flying commercially, they can expect an increase in their NPV at the age of 32 of $96,510.18. Table 16 reveals the effects of this increase when comparing the difference in NPV between veterans and retirees.

Table 16. Veteran NPV with Reserve Service minus Retiree NPV.

Airline	Amount
SW	($167,412.17)
Delta	$230,038.59
United	$519,216.21
American	$434,775.98
FedEx	$193,770.98

Adding the reserve component to the calculation only serves to increase the difference between NPVs for veterans over retirees. Again, for those seeking

employment with Southwest it is still smarter to remain in the Navy until retirement but the gap is not as large as it is for those who do not continue to serve in the reserves.

3. Sensitivity Analysis

The results above are all dependent on the inputs remaining fixed which is highly unlikely. Adjusting some of the inputs up and down determined how much flexibility there was in the results and helped determine which inputs influence NPV the most. Sensitivity analysis was conducted on all of the common inputs as well as the ACCP bonus. With the sensitivity analysis conducted in this study, it is important to note that only one variable was changed at a time and all others were kept constant.

a. ACCP

The initial calculations used a total value of $125,000 for the bonus based on the fact that $25,000 was the maximum amount allowed by congress to be paid out per year. There is speculation that the amount may be raised to $35,000 per year and that is analyzed in Table 17 along with some other common bonus amounts used in the past.

Table 17. Effect of ACCP on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Total Bonus	SW	Delta	American	United	FedEx
$ 75,000.00	$ (223,232.39)	$ 174,218.37	$ 378,955.76	$ 463,396.00	$ 137,950.77
$ 100,000.00	$ (243,577.37)	$ 153,873.39	$ 358,610.78	$ 443,051.01	$ 117,605.79
$ 125,000.00	$ (263,922.35)	$ 133,528.41	$ 338,265.79	$ 422,706.03	$ 97,260.80
$ 150,000.00	$ (284,267.33)	$ 113,183.42	$ 317,920.81	$ 402,361.05	$ 76,915.82
$ 175,000.00	$ (304,612.32)	$ 92,838.44	$ 297,575.83	$ 382,016.07	$ 56,570.84

For Southwest, as the total bonus is increased, the difference between NPV for veterans and NPV for retirees grows more and more negative. In this case, if the bonus was set at $75,000, a naval aviator who separated as a veteran would lose out on roughly $223,000 when compared to the aviator who stayed in until retirement.

When looking at the other airlines the trend shown is that as the total bonus amount increases in $25,000 increments, the NPV difference drops by roughly $20,000. Overall, though, it is still more advantageous for aviators to leave after completing their

ADSO but a larger bonus can go a long way in closing the gap, especially for FedEx and Delta.

Although it was assumed that only one variable would change at a time, the true value of the bonus is most closely linked to personal discount rate. The table above was derived using a 6.4 percent discount rate that is assumed for senior officers. Enlisted members tend to have higher discount rates around 10 percent and above (Military Compensation and Retirement Modernization Commission, 2015). If the $175,000 bonus is analyzed with a 10 percent discount rate, the differences in NPV are almost 50 percent lower (United's NPV difference would be roughly $194,000). This important to note because increasing bonuses could be more valuable than what is assumed.

b. Inflation

In the original calculations, inflation was set at 2.35 percent. The analysis in Table 18 shows that if the inflation rate drops, there will be a larger difference between a veteran's NPV and a retirees NPV, meaning it is even more advantageous to separate from the Navy earlier. The opposite holds true as inflation rates rise, however even at 3.5 percent it is still more advantageous to separate early, except for employment with Southwest and FedEx. For comparison purposes, Figure 3 shows historical inflations rates in the United States over the past 10 years. Southwest, Delta and FedEx all have a negative difference in NPV when inflation reaches four percent and above, a number that has not been reached since 2009.

Table 18. Effect of inflation on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Inflation Rate	SW	Delta	United	American	FedEx
1.0%	$ (173,701.22)	$ 227,370.63	$ 519,666.29	$ 434,180.75	$ 191,120.74
1.5%	$ (204,112.47)	$ 195,618.24	$ 486,759.07	$ 401,660.68	$ 159,346.60
2.0%	$ (237,948.03)	$ 160,441.53	$ 450,427.54	$ 365,716.30	$ 124,165.78
2.5%	$ (275,683.62)	$ 121,364.79	$ 410,195.97	$ 325,871.87	$ 85,103.57
3.0%	$ (317,867.05)	$ 77,840.22	$ 365,516.57	$ 281,579.63	$ 41,613.33
3.5%	$ (365,129.44)	$ 29,236.68	$ 315,758.20	$ 232,208.41	$ (6,934.92)
4.0%	$ (418,198.45)	$ (25,173.48)	$ 260,193.22	$ 177,030.57	$ (61,267.58)

Figure 3. Historical U.S. inflation rates. Source: Trading Economics (2016).

c. Rate of Return

If Southwest is removed from consideration, Table 19 reveals that returns of five percent and above will make it more profitable to leave after ADSO rather than wait until retirement. If returns are projected to be below five percent, employment with Delta and FedEx would be more profitable after retirement from the Navy while United and American would continue to remain more profitable after the ADSO.

Table 19. Effect of return rate on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Rate of Return	SW	Delta	United	American	FedEx
3%	$ (369,899.02)	$ (52,116.30)	$ 200,103.60	$ 120,296.17	$ (19,370.06)
4%	$ (354,317.64)	$ (24,624.52)	$ 233,010.78	$ 152,490.54	$ (2,230.98)
5%	$ (334,294.06)	$ 10,561.46	$ 275,160.13	$ 193,745.80	$ 19,792.65
6%	$ (308,572.47)	$ 55,603.61	$ 329,165.13	$ 246,627.84	$ 48,093.00
7%	$ (275,547.20)	$ 113,265.07	$ 398,369.93	$ 314,420.59	$ 84,454.30
8%	$ (233,167.11)	$ 187,074.22	$ 487,049.68	$ 401,322.99	$ 131,160.96
9%	$ (178,814.70)	$ 281,532.45	$ 600,664.24	$ 512,698.55	$ 191,134.78
10%	$ (109,153.00)	$ 402,377.07	$ 746,179.46	$ 655,391.29	$ 268,108.71

d. Personal Discount Rate

In the original calculations, the personal discount rate was set at 6.4 percent. This number was used by RAND when they analyzed the new retirement system. They determined that officers typically valued one dollar tomorrow at 94 cents today, thus a discount rate of roughly six percent. What this is assuming is that all officers are the same with regards to how they value money in the present and in the future which is far from realistic. Table 20 allows an aviator to understand the impact on NPV if they have a personal discount rate that is higher or lower than 6.4 percent. If an aviator believes their personal discount rate is lower they will find the difference in NPV's between veterans and retirees to increase which would make it even more valuable to separate earlier. The opposite holds true if they determine their personal discount rate to be greater than 6.4 percent.

Table 20. Effect of personal discount rate on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Discount Rate	SW	Delta	United	American	FedEx
3%	$ (602,348.26)	$ 200,079.37	$ 702,814.83	$ 578,219.32	$ (48,284.71)
4%	$ (445,163.32)	$ 196,327.48	$ 615,435.89	$ 505,240.19	$ 35,497.00
5%	$ (345,749.75)	$ 174,444.99	$ 529,627.05	$ 431,459.25	$ 77,283.18
6%	$ (282,378.70)	$ 145,600.35	$ 451,362.82	$ 363,320.37	$ 94,643.33
7%	$ (241,640.92)	$ 115,583.43	$ 382,679.69	$ 303,225.69	$ 98,059.20
8%	$ (215,203.59)	$ 87,203.22	$ 323,661.28	$ 251,545.43	$ 93,771.83
9%	$ (197,852.41)	$ 61,649.76	$ 273,508.85	$ 207,706.90	$ 85,479.08
10%	$ (186,301.84)	$ 39,262.02	$ 231,102.60	$ 170,769.70	$ 75,351.82

B. BLENDED RETIREMENT PLAN

Naval aviators falling under the blended retirement plan were analyzed based on the same two possible career options as those under the DB plan. The first option was to serve until completing their ADSO and then separate and join the airlines; these aviators are considered veterans. The second option was to serve in the Navy for 20 years and retire. Following retirement, these aviators will join the airlines. These aviators are considered retirees. The tables below will show the inputs for the calculations along with the results broken down by each airline.

1. Inputs to Calculations

At the age of 32 following roughly 10 years of service, naval aviators have the choice to stay in the Navy or separate. The following are the inputs that were used to calculate the NPV of these two career options at that time. The inputs in Table 21 and 23 are the same as they were in Table 11 and 13 in the defined benefit section. Table 22 has additional inputs when compared to Table 12 because of the matching TSP account. The government will match up to a maximum of five percent and it is assumed that all aviators will contribute that amount to maximize the government's contribution. The contribution factor is also new because contribution pay was not a part of the DB retirement plan.

Table 21. Common inputs to all calculations.

Inflation Rate	2.35%
Rate of Return	7.30%
Personal Discount Rate	6.40%

Table 22. Navy-specific inputs.

Projected Annual Pay Raise	1.4%
ACCP Bonus (total amount)	$125,000
Tax Incentive	15%
Gov't TSP Automatic Contribution	1%
Member TSP Contribution	5%
Gov't TSP Match (Years 5 and after)	4%
Continuation Pay Factor	14

For TSP accounts, the government will automatically contribute one percent every year regardless of what is contributed by the aviator. After completing four years of service, the government will begin to match TSP contributions. The total that can be contributed from the government through auto contributions and matching is five percent. To get that five percent maximum, aviators must contribute five percent themselves at which point the government will match at a rate of four percent and still make the automatic contribution of one percent for a total government contribution of five percent.

Table 23. Airline-specific inputs.

	Southwest	Delta	American	United	FedEx
401k Automatic Contribution	9.3%[15]	15%	16%	16%	8%
Projected Pay Raise	3%	3%	3%	3%	3%
Average Hours Flown	80	80	80	80	80
Union Dues	1.95%	1.95%	1.95%	1.95%	1.95%
Profit Sharing	10%	10%	10%	13%	0%
Minimum Hours Guaranteed	78	65	73	70	74

2. NPV Results

Using inputs from Tables 21, 22 and 23, NPVs were calculated and are displayed as described in Table 24 and the remainder of this section.

Table 24. NPV results at age 32.

Age	Navy Career	Airline	NPV
32	Veteran	Southwest	$2,510,639.20
32	Retiree	Southwest	$2,805,258.37
32	Veteran	American	$3,524,387.74
32	Retiree	American	$3,216,818.76
32	Veteran	Delta	$3,176,006.90
32	Retiree	Delta	$3,073,175.32
32	Veteran	United	$3,676,095.50
32	Retiree	United	$3,284,086.29
32	Veteran	FedEx	$3,366,268.32
32	Retiree	FedEx	$3,299,704.34

The NPVs represent a present-day value for what an aviator could expect to earn depending on which career path they follow and which airline they chose to fly for. It is important to remember that NPV is not the exact amount of money that will be earned but

[15] Southwest's 401k contribution is not automatic, it is a matching contribution that depends on how much each pilot contributes (Airline Pilot Central, n.d.). For this study, it is assumed that each pilot will ensure the match gets maximized.

instead it is an analytic construct. NPV is a tool for comparing different cash flows to determine which one is the most profitable if all the assumptions hold true. In Table 24, the United/Veteran option proves to be the most valuable followed by American/Veteran and FedEx/Veteran (these results match the results from the defined benefit section). The least valuable option is Southwest/Veteran followed by Southwest/Retiree. The big takeaway here is that the veteran option for the Navy career is the most profitable and Southwest as a whole (veteran and retiree options) is the least profitable.

The difference between NPV's for both Navy career options as shown in Table 25 reveals that if an aviator is making a purely financial decision, it is more valuable to separate from the Navy after finishing their initial commitment for all employment opportunities except for Southwest. In the case of employment at Southwest, it is financially smarter to remain in the Navy until retirement. It is clear when looking at the values though that the new blended retirement plan does decrease the difference in NPV's. The new difference in NPV is now almost $30,000 lower meaning the career earnings for retirees is now closer to veterans.

Table 25. Veteran NPV minus Retiree NPV.

Airline	Amount
SW	($294,619.17)
Delta	$102,831.58
United	$392,009.21
American	$307,568.97
FedEx	$66,563.98

Each calculation was done with the assumption that naval aviators that separated as veterans did not serve in the reserves. For those aviators who chose to serve in the reserves while flying commercially, they can expect an increase in their NPV at the age of 32 of $96,510.18. Table 26 reveals the effects of this increase when comparing the difference in NPV between veterans and retirees.

Table 26. Veteran NPV with Reserve Service minus Retiree NPV.

Airline	Amount
SW	$(198,108.99)
Delta	$199,341.76
United	$488,519.39
American	$404,079.15
FedEx	$163,074.16

Adding the reserve component to the calculation only serves to increase the difference between NPV's for veterans over retirees. Again, for those seeking employment with Southwest it is still smarter to remain in the Navy until retirement but the gap is not as large as it is for those who do not continue to serve in the reserves.

3. Sensitivity Analysis

Sensitivity analysis was conducted the same way for the blended retirement plan as it was for the defined benefit plan. The only difference is that the CP factor is analyzed along with all of the factors previously analyzed.

a. ACCP

ACCP again follows the same trend that for every $25,000 increase the NPV difference decreases by roughly $20,000 as shown in Table 27. For those seeking employment at United or American, raises to the bonus are not nearly as significant as it is for those considering Delta or FedEx. It is again important to point out the relationship between bonuses and personal discount rates. A bonus of $175,000 combined with a discount rate of 10 percent would yield negative NPV differences for Southwest, Delta and FedEx and it would bring United's NPV difference down to $138,764.27.

Table 27. Effect of ACCP on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Total Bonus	SW	Delta	United	American	FedEx
$ 75,000.00	$ (253,929.21)	$ 143,521.55	$ 432,699.18	$ 348,258.94	$ 107,253.95
$ 100,000.00	$ (274,274.19)	$ 123,176.57	$ 412,354.19	$ 327,913.96	$ 86,908.96
$ 125,000.00	$ (294,619.17)	$ 102,831.58	$ 392,009.21	$ 307,568.97	$ 66,563.98
$ 150,000.00	$ (314,964.16)	$ 82,486.60	$ 371,664.23	$ 287,223.99	$ 46,219.00
$ 175,000.00	$ (335,309.14)	$ 62,141.62	$ 351,319.25	$ 266,879.01	$ 25,874.02

b. Inflation

In the original calculations, inflation was set at 2.35 percent. Table 28 shows that if the inflation rate drops, there will be a larger difference between a veteran's NPV and a retiree's NPV, meaning it is even more advantageous to separate from the Navy earlier. The opposite holds true as inflation rates rise, however even at 3.5 percent it is still more advantageous to separate early, except for employment with Southwest and FedEx.

Table 28. Effect of inflation on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Inflation Rate	SW	Delta	United	American	FedEx
1.0%	$ (222,880.25)	$ 178,191.61	$ 470,487.26	$ 385,001.73	$ 141,941.71
1.5%	$ (247,047.03)	$ 152,683.67	$ 443,824.50	$ 358,726.12	$ 116,412.04
2.0%	$ (273,953.26)	$ 124,436.30	$ 414,422.30	$ 329,711.06	$ 88,160.54
2.5%	$ (303,979.53)	$ 93,068.89	$ 381,900.07	$ 297,575.97	$ 56,807.67
3.0%	$ (337,564.05)	$ 58,143.22	$ 345,819.57	$ 261,882.62	$ 21,916.33
3.5%	$ (375,211.75)	$ 19,154.37	$ 305,675.90	$ 222,126.10	$ (17,017.23)
4.0%	$ (417,504.74)	$ (24,479.78)	$ 260,886.93	$ 177,724.28	$ (60,573.88)

c. Rate of Return

The analysis in Table 29 reveals that for United, American and FedEx, if the rate of return is greater than three percent then it is advantageous to separate after completing ADSO. For Delta, a return rate of five percent or greater is required to make it more advantageous to separate earlier. It is important to note that the return rate does not impact FedEx's NPV difference as much as it does for the other airlines. This is a result

of their lower automatic contribution to their 401ks (8 percent instead of the 16 percent that most of the others receive).

Table 29. Effect of return rate on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Return Rate	SW	Delta	United	American	FedEx
3.0%	$ (339,430.13)	$ (21,647.40)	$ 230,572.49	$ 150,765.06	$ 11,098.84
4.0%	$ (332,554.83)	$ (2,861.71)	$ 254,773.59	$ 174,253.35	$ 19,531.83
5.0%	$ (323,913.78)	$ 20,941.73	$ 285,540.41	$ 204,126.08	$ 30,172.92
6.0%	$ (313,047.05)	$ 51,129.03	$ 324,690.55	$ 242,153.25	$ 43,618.42
7.0%	$ (299,373.62)	$ 89,438.65	$ 374,543.51	$ 290,594.17	$ 60,627.88
8.0%	$ (282,159.27)	$ 138,082.06	$ 438,057.52	$ 352,330.83	$ 82,168.80
9.0%	$ (260,476.19)	$ 199,870.96	$ 519,002.75	$ 431,037.06	$ 109,473.29
10.0%	$ (233,151.75)	$ 278,378.32	$ 622,180.70	$ 531,392.53	$ 144,109.96

d. Personal Discount Rate

In the original calculations, the personal discount rate was set at 6.4 percent. This number was used by RAND when they analyzed the new retirement system. RAND determined that officers typically valued one dollar tomorrow at roughly 94 cents today, thus a discount rate of 6.4 percent. What this is assuming is that all officers are the same with regards to how the value money in the present and in the future which is far from realistic. Table 30, allows an aviator to understand the impact on NPV if he or she has a personal discount rate that is higher or lower than 6.4 percent. If an aviator believes his or her personal discount rate is lower, he or she will find the difference in NPV's between veterans and retirees to increase which would make it even more valuable to separate earlier. The opposite holds true if he or she determines his or her personal discount rate to be greater than 6.4 percent.

Table 30. Effect of personal discount rate on difference in NPV.

Difference in NPV (Veteran - Retiree)					
Discount Rate	SW	Delta	United	American	FedEx
3.0%	$ (637,859.67)	$ 164,567.97	$ 667,303.42	$ 542,707.91	$ (83,796.12)
4.0%	$ (480,022.57)	$ 161,468.23	$ 580,576.65	$ 470,380.94	$ 637.75
5.0%	$ (378,838.57)	$ 141,356.17	$ 496,538.23	$ 398,370.43	$ 44,194.36
6.0%	$ (313,683.95)	$ 114,295.10	$ 420,057.57	$ 332,015.12	$ 63,338.08
7.0%	$ (271,573.78)	$ 85,650.57	$ 352,746.83	$ 273,292.84	$ 68,126.35
8.0%	$ (244,269.60)	$ 58,137.20	$ 294,595.26	$ 222,479.42	$ 64,705.81
9.0%	$ (226,506.26)	$ 32,995.91	$ 244,854.99	$ 179,053.05	$ 56,825.22
10.0%	$ (214,896.10)	$ 10,667.76	$ 202,508.35	$ 142,175.44	$ 46,757.57

e. Continuation Pay Factor

The CP factor is multiplied by one month of base pay to determine the bonus given for continued service in the Navy. A factor of two increases the bonus received by roughly $14,000 while it relates to a NPV change of roughly $12,000 as shown in Table 31. The end result is as the CP factor increases, the NPV difference will decrease bringing the NPV of a retiree closer to that of a veteran. The maximum CP of 22 will not make much of a difference for potential employees of United and American but a maximum CP of 22 can make a difference with Delta and FedEx if a high enough factor is used. Regardless of what the CP factor is, the difference in NPV is always greatest for United and then followed by American, Delta, FedEx and then Southwest.

Table 31. Effect of CP factor on difference in NPV.

Difference in NPV (Veteran - Retiree)					
CP Factor	SW	Delta	United	American	FedEx
8	$ (259,694.60)	$ 137,756.16	$ 426,933.79	$ 342,493.55	$ 101,488.56
10	$ (271,336.12)	$ 126,114.64	$ 415,292.26	$ 330,852.03	$ 89,847.03
12	$ (282,977.65)	$ 114,473.11	$ 403,650.74	$ 319,210.50	$ 78,205.51
14	$ (294,619.17)	$ 102,831.58	$ 392,009.21	$ 307,568.97	$ 66,563.98
16	$ (306,260.70)	$ 91,190.06	$ 380,367.68	$ 295,927.45	$ 54,922.46
18	$ (317,902.22)	$ 79,548.53	$ 368,726.16	$ 284,285.92	$ 43,280.93
20	$ (329,543.75)	$ 67,907.01	$ 357,084.63	$ 272,644.40	$ 31,639.40
22	$ (341,185.28)	$ 56,265.48	$ 345,443.11	$ 261,002.87	$ 19,997.88

C. ALTERNATIVE ACCP PLAN

An effective way to shrink the gap in the NPV difference between veterans and retirees is to redesign the Navy's ACCP program. As it currently stands, the Navy's ACCP program only incentivizes aviators to complete their department head tours. An alternative would be to incentivize aviators to compete for a command tour while being financially rewarded for completing it. One of the downsides ACCP as it is currently implemented is the potential for a pay inversion. This can lead to DHs being paid more than the executive officer because they are potentially receiving a $25,000 annual bonus while the upper chain of command is no longer receiving a bonus. The alternative ACCP plan studied here would remove this pay inversion by paying aviators bonuses through the completion of their command tour. The following are proposed guidelines for an alternative plan:

- Aviators become eligible to apply for ACCP once selected for O-4.
- Aviators will receive annual ACCP bonus installments until completion of command tour.
- Aviators will only receive annual installments if they continue to reach aviation related career milestones. Once an aviator fails to meet a milestone (DH screen, O-5 promotion, command screen) they will stop receiving their annual installment.
- Following command tours, a new ACCP plan will need to be formulated to ensure naval aviation retains its most talented and experienced aviators. (This is outside the scope of this thesis but would be required)

The following are two proposals for alternative ACCP plans and how much they would cost the Navy. It is also important to note that the ACCP program includes NFOs as well as pilots so they will both be considered in the following two proposals despite the fact that the main focus of this study is on pilots. The proposals will break up all aviators into three groups: NFOs, rotary-wing pilots (RWP) and fixed-wing pilots (FWP).

1. Proposal 1

In this proposal, all three groups of aviators will be paid the same annual bonus of $25,000. For those aviators that hit all their milestones and complete a command tour, they will earn $225,000 over nine years as shown in Table 32.

Table 32. Bonus payments under Proposal 1.

Year of Service	Rank	Milestone	Annual Payment	
10	O-3	O-4 Select	$ 25,000.00	
11	O-4	DH Select	$ 25,000.00	
12	O-4	DH	$ 25,000.00	
13	O-4	DH	$ 25,000.00	
14	O-4	DH	$ 25,000.00	
15	O-4	Post DH	$ 25,000.00	
16	O-4	O-5/CMD Select	$ 25,000.00	
17	O-5	XO	$ 25,000.00	
18	O-5	CO	$ 25,000.00	
		Total Payment	$ 225,000.00	If all milestones are met

For those aviators that intend to stay in the Navy until retirement, Proposal 1 would have the following impact on NPV as shown in Table 33.

Table 33. Effect of Proposal 1 on NPV.

Airline	NPV difference under current ACCP[16] (DB retirement)	NPV difference under Proposal 1 (DB retirement)	NPV difference under current ACCP (Blended retirement)	NPV difference under Proposal 1 (Blended retirement)
SW	($263,922.35)	($311,422.95)	($294,619.17)	($342,119.77)
Delta	$133,528.41	$86,027.81	$102,831.58	$55,330.99
United	$422,706.03	$375,205.44	$392,009.21	$344,508.62
American	$338,265.79	$290,765.20	$307,568.97	$260,068.38
FedEx	$97,260.80	$49,760.21	$66,563.98	$19,063.39

Proposal 1 would shrink the NPV difference between veterans and retirees by roughly $48,000 which would make the Navy career option much more comparable for pilots who are considering employment with Delta and FedEx.

2. Proposal 2

In proposal 2, the three groups of aviators would not be paid the same. FWP's would be paid the highest amount each year based on their value to the commercial aviation sector. This means they would receive an annual bonus of $30,000 for a total of

[16] Current ACCP assumes $125,000 total bonus.

$270,000 over nine years if they meet all career milestones. RWP's and NFO's would each receive $20,000 per year and a total of $180,000 over nine years if they reach all career milestones. Table 34 shows what the payments would look like over the course of a career.

Table 34. Bonus payments under Proposal 2.

Year of Service	Rank	Milestone	Annual Payment FWPs	Annual Payment RWPs	Annual Payment NFOs
10	O-3	O-4 Select	$ 30,000.00	$ 20,000.00	$ 20,000.00
11	O-4	DH Select	$ 30,000.00	$ 20,000.00	$ 20,000.00
12	O-4	DH	$ 30,000.00	$ 20,000.00	$ 20,000.00
13	O-4	DH	$ 30,000.00	$ 20,000.00	$ 20,000.00
14	O-4	DH	$ 30,000.00	$ 20,000.00	$ 20,000.00
15	O-4	Post DH	$ 30,000.00	$ 20,000.00	$ 20,000.00
16	O-4	O-5/CMD Select	$ 30,000.00	$ 20,000.00	$ 20,000.00
17	O-5	XO	$ 30,000.00	$ 20,000.00	$ 20,000.00
18	O-5	CO	$ 30,000.00	$ 20,000.00	$ 20,000.00
		Total Payment	$ 270,000.00	$ 180,000.00	$ 180,000.00

For those aviators that intend to stay in the Navy until retirement, Proposal 2 would have the following impact on NPV as shown in Table 35.

Table 35. Effect of Proposal 2 on NPV.

Airline	NPV difference under current ACCP[17] (DB retirement)	NPV difference under Proposal 2 (DB retirement)	NPV difference under current ACCP (Blended retirement)	NPV difference under Proposal 2 (Blended retirement)
SW	($263,922.35)	($341,268.05)	($294,619.17)	($371,964.87)
Delta	$133,528.41	$56,182.71	$102,831.58	$25,485.89
United	$422,706.03	$345,360.34	$392,009.21	$314,663.51
American	$338,265.79	$260,920.10	$307,568.97	$230,223.28
FedEx	$97,260.80	$19,915.11	$66,563.98	($10,781.71)

[17] Current ACCP assumes $125,000 total bonus.

Proposal 2 would shrink the NPV difference between veterans and retirees by roughly $77,000 which would make the Navy career option much more comparable for pilots who are considering employment with Delta and FedEx.

3. Cost of Proposals

There is a cost associated with making the Navy's compensation for aviators more comparable to the airlines. The current ACCP plan is projected to cost the Navy $33.2 million in FY17, $35.3 million in FY18, $36.9 million in FY19 and $38.2 million in FY20. (Department of the Navy, 2015). To determine the cost of Proposal 1, data from FY13 through FY16 was compiled in Table 36 to determine the average number of FWPs, RWPs and NFOs to hit each milestone and break them into percentages.

Table 36. Aviation milestone data by aviation groups. Adapted from Navy Personnel Command (2016), Navy Personnel Command (n.d.a).

	O-4 Selects			DH Sels			O-5 Sels			CMD Sels		
	FWP	RWP	NFO	FWP	RWP	NFO	FWP	RWP	NFO	FWP	RWP	NFO
Average	180	147	101	123	100	81	95	77	69	59	37	33
Percentage	42%	34%	24%	40%	33%	27%	39%	32%	29%	46%	29%	26%

Using the data from Table 36, cost for Proposal 1 and Proposal 2 are listed in Table 37 and Table 38, respectively.

Table 37. Cost of Proposal 1.

Year of Service	Rank	Milestone	Total Personnel	Yearly Payment	Total Paid
10	O-3	O-4 Select	428	$ 25,000.00	$ 10,700,000.00
11	O-4	DH Select	304	$ 25,000.00	$ 7,600,000.00
12	O-4	DH	304	$ 25,000.00	$ 7,600,000.00
13	O-4	DH	304	$ 25,000.00	$ 7,600,000.00
14	O-4	DH	304	$ 25,000.00	$ 7,600,000.00
15	O-4	Post DH	304	$ 25,000.00	$ 7,600,000.00
16	O-4	O-5/CMD Select	241	$ 25,000.00	$ 6,025,000.00
17	O-5	XO	129	$ 25,000.00	$ 3,225,000.00
18	O-5	CO	129	$ 25,000.00	$ 3,225,000.00
		TOTAL PAID		$ 225,000.00	$ 61,175,000.00

Table 38. Cost of Proposal 2.

				NFO's			Rotary Pilots			Fixed Wing Pilots		
Year of Service	Rank	Milestone	Total Personnel	% of Total	Yearly Payment	Total Paid	% of Total	Yearly Payment	Total Paid	% of Total	Yearly Payment	Total Paid
10	O-3	O-4 Sel	428	24%	$20,000	$ 2,054,400.00	34%	$20,000	$ 2,910,400.00	42%	$30,000	$ 5,392,800.00
11	O-4	DH Sel	304	27%	$20,000	$ 1,641,600.00	33%	$20,000	$ 2,006,400.00	40%	$30,000	$ 3,648,000.00
12	O-4	DH	304	27%	$20,000	$ 1,641,600.00	33%	$20,000	$ 2,006,400.00	40%	$30,000	$ 3,648,000.00
13	O-4	DH	304	27%	$20,000	$ 1,641,600.00	33%	$20,000	$ 2,006,400.00	40%	$30,000	$ 3,648,000.00
14	O-4	DH	304	27%	$20,000	$ 1,641,600.00	33%	$20,000	$ 2,006,400.00	40%	$30,000	$ 3,648,000.00
15	O-4	Post DH	304	27%	$20,000	$ 1,641,600.00	33%	$20,000	$ 2,006,400.00	40%	$30,000	$ 3,648,000.00
16	O-4	O-5/CMD S	241	29%	$20,000	$ 1,397,800.00	32%	$20,000	$ 1,542,400.00	39%	$30,000	$ 2,819,700.00
17	O-5	XO	129	26%	$20,000	$ 670,800.00	29%	$20,000	$ 748,200.00	46%	$30,000	$ 1,780,200.00
18	O-5	CO	129	26%	$20,000	$ 670,800.00	29%	$20,000	$ 748,200.00	46%	$30,000	$ 1,780,200.00
Possible Earnings Per Group					$180,000.00			$ 180,000.00			$ 270,000.00	
Total Paid Pers Group						$ 13,001,800.00			$ 15,981,200.00			$ 30,012,900.00
Total Paid to All Groups												$ 58,995,900.00

At roughly $61 million, the Navy would have to be prepared to spend about $25 million more annually on ACCP than they are currently spending to implement Proposal 1. Implementing Proposal 2 would cost roughly $59 million and would actually save the Navy $2 million when compared to Proposal 1. Both Proposal 1 and 2 provide flexibility to change the yearly payments per group (NFO, RWP and FWP) based on retention numbers and commercial opportunities.

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V. CONCLUSIONS

A. RECOMMENDATIONS

The results in Chapter IV revealed that there is a significant difference in NPV depending on when an aviator separates from the Navy. The difference in NPV is also dependent on the type of carrier that is being discussed. Of the five airlines studied, all the legacy and cargo airlines (Delta, United, American and FedEx) had a positive difference in NPV meaning it was financially wise for aviators desiring to fly for them to separate after their ADSO is up and not stay in the Navy until retirement. Southwest was the only major airline analyzed and they were also the only one with a negative NPV which meant that is was a better to stay in the Navy until retirement and then seek employment with them. It is important to note that Southwest is considered the biggest and best compensating of all the major airlines which includes others such as JetBlue, Frontier, Spirit and Virgin. This allows us to draw the conclusion that unless employment will be gained with Delta, United, American or FedEx,[18] it will be better financially to remain in the Navy until retirement before seeking to transition.

In Chapter II, prospective airline hiring trends were discussed. The GAO report (2015) cited projected the hiring of approximately 1,900 new pilots and this was the low end of the spectrum. Currently, the five airlines analyzed in this study are projected to hire a combined 2,500 new pilots in 2016. Southwest, the only airline that consistently had a negative NPV difference is only projected to hire 616 new pilots which means the other 75% of hires will go to airlines that had positive NPV differences (Future and Active Pilot Advisors (FAPA)). This ratio is significant because on financial terms, the Navy simply cannot compete with the airlines projected to hire the majority of the new pilots in 2016.

The good news for the Navy is that the implementation of the new retirement plan in 2018 will actually lower the NPV differences by roughly $31,000. This decrease will

[18] UPS was not studied but they could be considered part of this list as the offer a similar compensation package to FedEx.

not be significant when looking at United and American because of how large the NPV difference is for these two airlines but Delta and FedEx have much smaller NPV differences and if the Navy could increase compensation, the decision to separate for purely financial reasons would not be so obvious.

At the end of Chapter IV, two ACCP proposals were laid out as ways to potentially shrink the NPV differences even more. If either one was implemented they would indeed achieve that desired effect. Both proposals would do a good job or leveling the financial playing field with respect to Delta and FedEx. Southwest is not a factor as they had a negative NPV difference from the beginning and both United and American are in a league that the Navy is not able to compete in.

One factor to consider when looking at the cost to implement a new ACCP plan is the cost to train an aviator. The average cost to train aviators was almost $2 million per aviator in 2008, with jet pilot training costing almost $3.3 million (Daly et al., 2008). If retention rates fell low enough that the Navy needed to send more pilots through flight school each year, the additional $25 million expense to implement a new ACCP plan would only cover the expenses of about 12 more aviators which would not produce a significant change to retention rates.

The Navy is now left with a major decision to make. They need to decide if it is worth the money to implement a better paying ACCP to attempt to compete in a competition they can never fully win. The only thing the Navy cannot afford to do is to take no action. Failure to address this potential problem now while the Navy can stay in front of it could have disastrous results. One or two years of low retention rates would not only impact future command boards but it would also impact the future choices being made by aviators still in their first sea tours. Low retention rates could lead to selection of department heads who are less than qualified. DHs of this caliber are usually not good leaders or aviators yet they have significant responsibilities in molding first tour officers into the future leaders of the Navy. This underscores the significance of the Navy staying ahead of this problem and getting it right.

B. FUTURE STUDY

Two main areas that are outside the scope of this thesis could be studied. The first is the impact of a redesigned ACCP program like the ones proposed here. Retention studies have been conducted in the past but never with a totally different plan to propose. A retention study with very specific questions about bonuses and also questions that would help to determine personal discount rates would prove extremely valuable if the Navy attempts to implement a new ACCP plan. The other topic of future study would be centered on risk. Risk is at the center of the decision to stay in the Navy or to separate. While the Navy does a great job at publishing lesson learned after each selection board or screen board, there is a great deal that is unknown about the airlines and how much risk is involved in that career path. Both of these are worth a deeper look and would be very beneficial to the Navy and the aviators trying to make an informed decision.

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